tive attraction for the surrounding tissues depends. When the elements of the blood do not undergo normal mutations, they may be attracted towards the solid tissues surrounding the capillaries; but, as they do not undergo that series of cellular changes which completely liberates the nutritive elements from the effort, they are to some degree repelled by the solid tissues, because these tissues attract nutritive elements strictly in obedience to the laws of their ultimate elementary composition. Alterations in the chemical condition of the blood are, therefore, caused by a lesion of organic innervation, and produce a lesion of capillary circulation by which the elements of the blood aggregate in obedience to the laws of chemical affinity. This proposition enables us to comprehend the magnitude of morbid action produced in the whole organism when the lungs fail to absorb a normal quantity of oxygen, or secrete a normal quantity of carbonic acid gas; when the liver fails to secrete normally its carbonaceous compounds; or the kidneys, the effete azotized elements of the transformed tissues. When all these depuratory glands at the same time fail to perform their normal functions, the blood is soon rendered unfit for the purposes of the organism; a diseased transformation of all the tissues of the organism is produced.

ART. VII.—*On Incontinence of Urine in Children.* By D. D. SLADE, M. D.,
of Boston.

INCONTINENCE of urine in children is one of those affections with which the practitioner constantly meets, and although in general it is one of no serious character, yet it often proves extremely rebellious to all treatment, and becomes exceedingly annoying to the medical man, not only from its obstinate persistence, but from the very fact of its apparent insignificance.

The discharge of the contents of the bladder and rectum take place involuntarily in early infancy; but as the child advances in age it acquires a control over the sphincters, being prompted to this by a sense of decency as well as by other influences. The involuntary discharge of the contents of the bladder may, however, from a variety of causes, be kept up to the age of puberty, and even later, proving a source of inconvenience and extreme mortification to the unhappy subject of it.

We shall arrange these children who suffer from incontinence of urine into three classes. In the first class, the affection is constant and due to special causes which need not occupy our attention here. In the second, it is intermittent in its character, occurring in the day as well as in the night; while in the third class it is nocturnal only.

In the second of these classes, which constitute cases by no means rare, and much less amenable to treatment than those where the affection is only

nocturnal, the urine passes off involuntarily not only during sleep, but also during the day, the patient not unfrequently finding his clothes wet without having been conscious of having emptied the bladder. Moreover, he is at all times obliged to urinate more often than natural, and can scarcely ever resist the desire the moment it is felt. This form of incontinence is intermittent, the patient at certain periods being almost entirely rid of his complaint.

It is also, we think, more often found among children of a lymphatic temperament, and who require a tonic treatment; and it even appears to be hereditary, as we have seen several members of a family afflicted as were their parents before them. This hereditary tendency is also seen in the nocturnal form.

In some of the cases of the above class, the urine is copious, pale-coloured, and of low specific gravity, but very frequently neither the quality nor the quantity of urine seems to be at fault, but there is a peculiar morbid condition of the urinary organs. This condition, as Gross remarks, is undoubtedly due to a morbid irritability of the neck of the bladder, to an exaltation of the natural sensibility of that part, often unaccompanied by any appreciable change of structure.

It may also depend wholly, or in part, upon sympathy with a diseased condition of the rectum, vagina, uterus, or kidney.

The cases coming under the third class do not always constitute a malady, properly speaking, but often merely a habit. M. Petit separates children suffering with the nocturnal form of incontinence only into three categories. The first is made up of those who are too lazy to rise from bed in order to satisfy Nature at her first bidding. The second, of those who sleep so soundly that the sensation which precedes the desire to urinate is not sufficient to awake them; the neck of the bladder is the only portion which feels, so to speak, and which, accustomed to obey this sensation, opens mechanically and suffers the urine to pass without the brain being warned. The third, of those who dream that they are urinating against a wall, or into a vessel, &c.

The incontinence of the first and last categories does not depend upon any pathological condition of the urinary apparatus, and its treatment consists entirely in the adoption of moral means. That which comes under the second category is alone to be referred to a morbid condition, and is thus explained by M. Barrier, in his *Traité Pratique des Maladies de l'Enfance*.

"It is easy to conceive how infancy predisposes so powerfully to nocturnal enuresis. At this age the muscular system of organic life enjoys a contractility much more pronounced; all the reservoirs which are provided with this are more frequently emptied. Now, the bladder has a muscular coat, the contractions of which, at least in part, are under the influence of the ganglionic system of nerves, and, therefore, removed from the influence of the will. During the day, the effects of these contractions are prevented either by the simple tonic force of the constrictor muscles of the neck of the bladder, or by their voluntary contraction; but sleep, which abolishes all voluntary contractility, has no such effect upon the sensible organic contractility.

"It would, perhaps, be even easy to show that this latter is augmented during sleep. However it may be, the suppression of the will during sleep destroys the equilibrium existing between two powerful antagonists in favour of that which naturally predominates in infancy.

"Sleep also abolishes the functions of sense and of intellect more completely than those of instinct, consequently many of these last are performed during that state.

"Other influences also act in a similar manner, such as those dependent upon a feeble constitution, upon a lymphatic temperament, and upon inheritance. As to the occasional causes, it is easy to understand that drinking in large quantities, or forgetting to make the child empty the bladder before retiring, the warmth of the bed, &c., ought to favour the involuntary emission of the urine.

"A circumstance which tends to keep up this affection, is the habit which the bladder soon acquires of emptying itself at certain hours, under the influence of the causes of which we have spoken. We know that the frequent repetition of the same act contributes to its maintenance by the most trivial causes; all our organic functions, as digestion, the excretions, &c., are subject to the laws of habit. The influence of habit, then, partially explains the obstinate persistence of nocturnal enuresis, which is often prolonged to adolescence in spite of all remedies."

M. Civiale differs from most authors as to the cause of nocturnal enuresis in children. He remarks that he has observed this condition in subjects whose bladders, being in a sluggish state, were continually distended by a certain quantity of urine, and that the incontinence here observed is due to a veritable overflowing, analogous to that which happens in every form of retention.

If such is the cause of this affection, and as frequent a one as M. Civiale would lead us to suppose, how does it happen that this overflowing takes place only during sleep? We cannot deny that such a cause may operate in rare cases, and the very existence of it should lead us to be very guarded in our diagnosis and treatment.

M. Caudmont, of Paris, has advanced the opinion that incontinence of urine in children is often dependent upon what he terms "a contraction of the neck of the bladder," comprehending under the term "neck of the bladder," not only the urethro-vesical orifice, but the prostatic and membranous portions of the urethra, extending from the above orifice, to the triangular ligament. The involuntary and permanent contraction of the muscular fibres of this part of Guthrie's and Wilson's muscles, gives rise to a variety of symptoms, which are generally described by authors as dependent upon a neuralgia or *névrose* of this region. To this permanent contraction, or rather to its consequences, M. Caudmont attributes incontinence of urine, and accounts for the beneficial action of belladonna, of which we shall soon speak, by its power of overcoming this condition.

M. Civiale describes this very contraction in speaking of vesical neuralgia—

"The sensibility and contractility of the neck of the bladder being inti-

mately connected, the augmentation of the one ought necessarily to modify the other, and thus create trouble in the functions of the bladder. We shall see, in fact, when we come to examine the diseases of this organ, that this contraction of its neck plays a great part in most of the affections by which it is attached."

We saw, while under M. Caudmont's instruction, sufficient to convince us that his views upon this point were very just and well founded; and, moreover, that they were confirmed by his successful mode of treatment. We shall, at some future time, explain more fully this "contraction of the neck of the bladder," and describe its intimate connection with several other common and obstinate affections daily presented to the notice of the practitioner, the causes of which have been heretofore very obscure.

We shall not speak here of those specific causes of incontinence of urine, such as stone, paralysis, &c., but shall pass on to the treatment of this complaint.

If our knowledge respecting the causes of the common forms of enuresis in children is thus vague and hypothetical, can we offer anything more satisfactory respecting its treatment? This may be quickly decided.

First.—Of the treatment of those cases where the incontinence is by day as well as by night. The treatment of this form should be general and local.

The first has for its object to overcome the influence of hereditary disease which has a tendency to debilitate the constitution. This end may be best brought about by proper attention to diet, which should be plain, and at the same time generous and nutritious; exercise in the open air, regulation of the bowels, cold bathing if it can be supported, and the use of a proper course of tonics. As in this form of incontinence particularly, there is more or less morbid irritability of the neck of the bladder, we advise the use of sedatives. Any unnatural condition of the urine must, of course, be corrected.

By the local treatment we propose to modify any undue sensibility or irritability of the bladder. This comprehends douches of cold water to the sacro-lumbar region, the application of blisters to the sacrum and perineum, the occasional passage of the bougie, and in extremely obstinate cases even a slight cauterization of the neck of the bladder.

Second.—Of the treatment of those cases where the incontinence is entirely nocturnal. As with many children this form of enuresis is cured spontaneously towards the age of four or five years, we should be careful not to pursue a too active treatment before this age, in endeavouring to overcome what, after all, with them is an affection of small importance; but, when it is proper to interfere, we must first advise the influence of moral means, which should never be harsh or cruel, but just sufficient to awaken the child to a sense of shame.

This has especial reference to those cases where we suppose the trouble to be the result of laziness; if this be the case, we cannot make the habit too disagreeable to the individual. What we have already said as regards the

general treatment in the other form, is also applicable here. The diet should be mild and unirritant. The supper should be taken at an early hour, and nothing should be given after this. The child should sleep on a mattress, with just sufficient clothing to be perfectly comfortable, and should be aroused two or three times, if necessary, in order to empty the bladder. Most writers speak of the importance of the position to be kept during sleep, viz: upon the side, and not upon the back. We agree with Dr. Condie, who remarks that the position of the child during sleep is of little or no consequence; the discharge from the bladder taking place, no matter what may be the position. The trouble is doubtless often kept up by mere force of habit, and if the particular hour can be ascertained when the involuntary discharge takes place, and the patient awakened just before the occurrence, and made to empty the bladder, he soon acquires the power of retaining his urine during the entire night.

Sometimes also the affection is due to an irritation produced in the neighbouring parts by the presence of ascarides. We should always bear this in mind in making up our treatment, and direct it accordingly.

We come now to speak of internal remedies, some of which have received high encomiums, without, we think, sufficient grounds. Strychnine and cantharides are highly recommended by almost all writers, the latter carried to the extent of producing slight strangury. Gross speaks favourably of this remedy, which he states has succeeded where everything else has failed.

When any irritability exists about the bladder, copalva in small doses, and eubebs in powder, have lately been highly extolled. Dr. Deiters recommends from his own experience, the effects of the latter medicament in tolerably large doses given twice a day during a period of from three to eight weeks. A small anodyne at night, in the form of a Dover's powder, often exerts a beneficial effect. But it is to belladonna that we wish particularly to call the attention of the profession. M. Trousseau has been most instrumental in bringing this substance into notice as being applicable to these particular cases of incontinence in children, and we can testify to its highly beneficial effects in several cases in our own practice, besides those which we observed in the *Hôpital des Enfants Malades*.

The following is from the clinical lectures of M. Trousseau:—

"This infirmity I consider a neuralgia or *névrose*, and it is much more common than is generally believed. It has been thought nearly incurable; but, with belladonna, is one of the most easily cured of all diseases.

"Those children who are troubled in the daytime are not cured by belladonna."

"A child going to bed with an empty bladder will pass his water during the first two hours, sometimes during the first hour; placed in bed at 9 o'clock, the bladder will throw off its contents at 10 o'clock, and then retain them until 8 o'clock the following morning, being full at that time. The accident generally happens once only during the night, but sometimes twice. During the first hours of sleep, you generally find in young men and children an erection. The question may be asked, whether something of the same kind may not take place in the bladder. This complaint is most common among

young girls, and is generally cured spontaneously at the age of puberty; but when this is not the case, do what chance has shown to be efficacious.

"Two young girls afflicted with whooping-cough were treated with belladonna, and were cured both of the cough and of the affection now under consideration.

"*Treatment.*—The first precaution is to break up the bad habit of the organs. Wake the child at the end of an hour, and make him pass his water; after several days, make him at the end of an hour and a half. This is only accessory.

"Give at the moment of going to bed, ext. belladonna in pill, commencing with gr. $\frac{1}{8}$, waking the child as has been described. After 8 days, increase the dose to double; at the end of 8 days more, treble it, waking him later and later, and finally not at all. When during 15 days he has been free from the difficulty, diminish the dose, or give it only every second day, then every third day, &c. Even if the child does not regain its bad habits, renew the medicine after two, three, and sometimes five months' cure, for he may then again begin to wet the bed. Resume the medicine as first given, several times, making the intervals longer and longer.

"The incontinence may be aggravated by eczema, caused by the constant irritation of the urine; and the urethra becoming inflamed, the desire to pass water is increased. For this state of things a sol. sulph. zinci is the best application.

"If belladonna fails, try strychnine, flagellation, and stinging with nettles. The two latter may be useful as means of intimidation, or perhaps they may have some reflex power."

So far as our experience goes, we have derived very satisfactory results from the use of belladonna in several cases of nocturnal incontinence. But as Trousseau explicitly says, it did not have the same good effects in those cases where the enuresis occurred during the day, although it greatly relieved the trouble. We have, however, found that a larger dose was required than is recommended by that physician, in order to have the desired effect.

Reasoning from what we have stated as to the probable causes of this affection when it occurs during the day as well as night, we should be led to suppose that belladonna was even more applicable in this than in the nocturnal form only. Practical experience, however, shows that such is not the fact.

It remains for us to speak of mechanical contrivances for the removal of this complaint. The old method of tying the penis is absurd; but certain compressor bandages, such, for instance, as the one which Trousseau recommends, may be of service when other means have failed. This is composed of an elastic band placed about the body, supporting at the back a steel spring which reaches to the anus. To this is fitted a metallic plate, on which is fixed a truncated cone of India rubber, about two-thirds of an inch in diameter at the base. The pressure should be made directly upon the middle line of the perineum, and may be regulated by introducing the cone more or less deeply. The compression thus acts as a sphincter upon the prostatic portion of the urethra. The same beneficial effects may, as Gross remarks, be derived from the use of a bit of bougie placed along on the under surface of the penis, the point projecting a short distance beyond the gland, and retained in

its place by strips of adhesive plaster. In this way, the walls of the urethra are so approximated that no urine can pass. Of course, it must be removed when necessary to empty the bladder.

For girls, M. Trousseau makes use of an India-rubber bag, which is introduced beyond the hymen, and by means of a tube inflated with air, which is retained by a stopcock. This contrivance presses upon the lower part and neck of the bladder, preventing the escape of urine. In the morning, the instrument being emptied of air, it is removed or reapplied according to circumstances.

Such are the principal considerations which we have to offer upon this *bizarre* affection. Much is yet left to be discovered as to its causes and proper treatment, and this knowledge is only to be gained by long-continued and persevering observation. We may hope at some future day to contribute the results of our experience towards such a desirable end.

ART. VIII.—*Three Surgical Cases.* Reported by J. C. NOTT, M.D.,
of Mobile, Alabama. (With a wood-cut.)

THE following cases possess sufficient novelty and practical value to deserve publication:—

CASE I.—*Spina Bifida cured by Excision.*—The subject of this case, aged one month, was a male, and the child of an Irish woman; it presented, about the middle lumbar vertebra, a tumour an inch and a half in diameter, nearly circular, and elevated about three-quarters of an inch. The appearance of the tumour was unusual, and the first impression on my mind was that of fungus hematodes; the summit was nearly flat, of a reddish-chocolate colour, and in the centre was a thin pellucid membrane of about three-fourths of an inch in extent, through which could be seen serous fluid. The most graphic description I can give of the appearance of the tumour is that it resembled a half ripe carbuncle with a Malaga grape buried in the centre; had it not been for this deficiency of skin in the centre I should have been much embarrassed to form a diagnosis. Guided by a case somewhat similar, though smaller, reported by Dr. Mott, of New York, in his Appendix to Velpeau, I determined to extirpate the entire mass. I accordingly, on the 15th of March, 1855, in the presence of Drs. J. Hamilton, Vetebum, and Anderson, and my student, Mr. Childs, incised the tumour by two elliptical incisions in the direction of the spine, and dissected it out completely; the tumour was found to consist simply of skin, cellular tissue, and the membranes of the spine distended with serum. After the sac was removed, an opening into the spinal canal was ex-